

# Proposed Basin Plan Amendment for Control of Discharge of Diazinon and Chlorpyrifos Into the San Joaquin River



## CEQA Scoping Meeting and Public Workshop

January 19, 2005

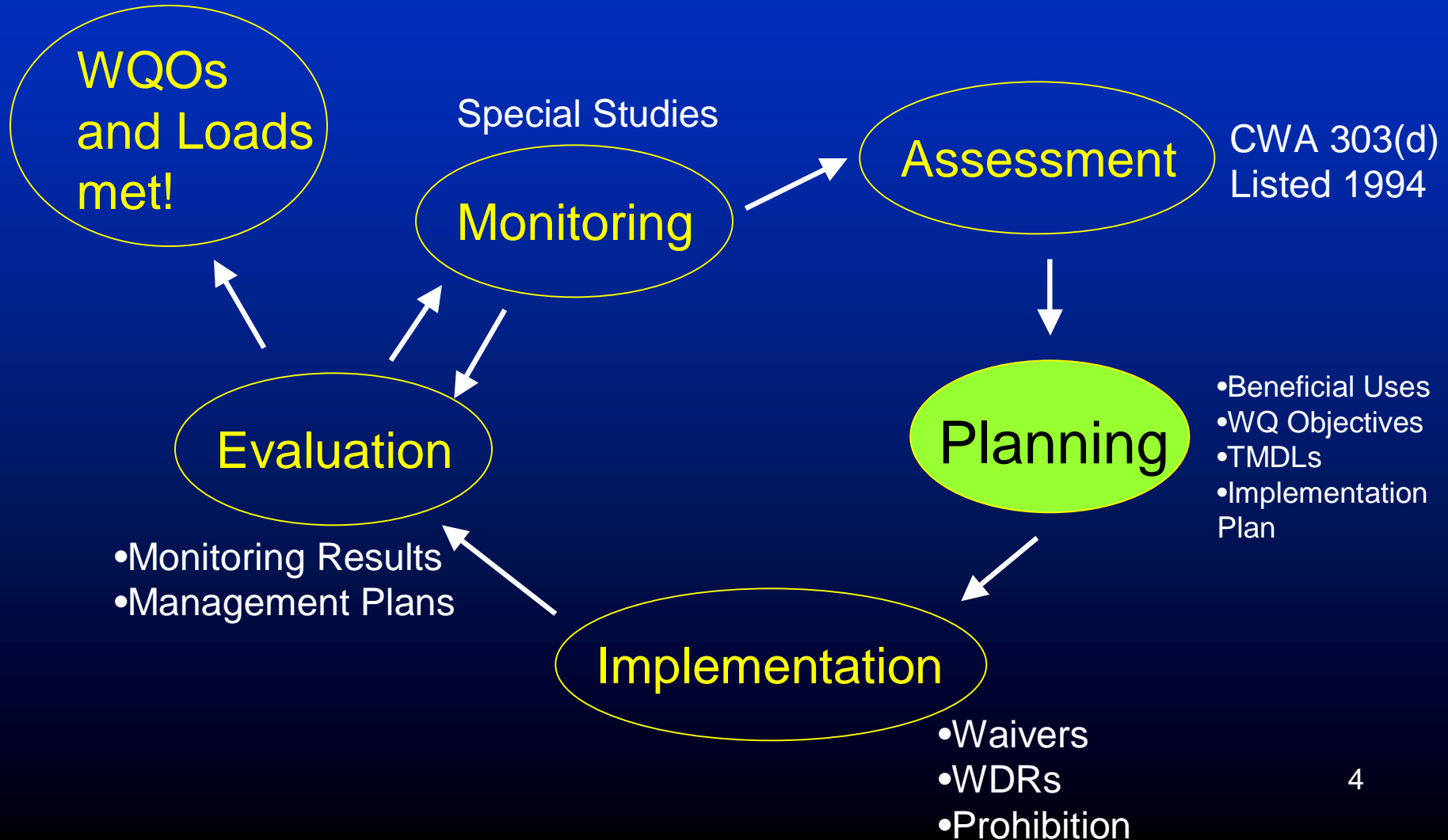
# Introductions

- Les Grober, Chief, San Joaquin River TMDL Unit
- Diane Beaulaurier, Environmental Scientist, San Joaquin River TMDL Unit
- Joe Karkoski, Pesticide TMDL Coordinator

# Agenda

- Introduction (5 min)
- Background (15 min)
- Alternative Water Quality Standards (15 min)
- Implementation Alternatives (10 min)
- Break (15 min)
- Proposed Recommendations (25 min)
- Summary and Next Steps (10 min)
- Time for Questions at end of each section

# Where are we in the process?



# Where are we in the process?

Initial outreach of OP Pesticide TMDL	August 2000
6 Workshops – TMDL Elements	Nov 2000-Sept 2002
CEQA Scoping Meeting	January 2005
Draft BPA Staff Report to Peer Review	Jan-Feb 2005
Staff or Regional Board Workshop	April-June 2005
Regional Board Hearing	August 2005
State Board Approval	Estimated 2005
Office of Administrative Law Approval	Estimated 2006
USEPA Approval	Estimated 2006

# Scope of CEQA Analysis

- Staff presentation of alternatives
- Public comments on scope of this TMDL and alternatives considered

# Questions?



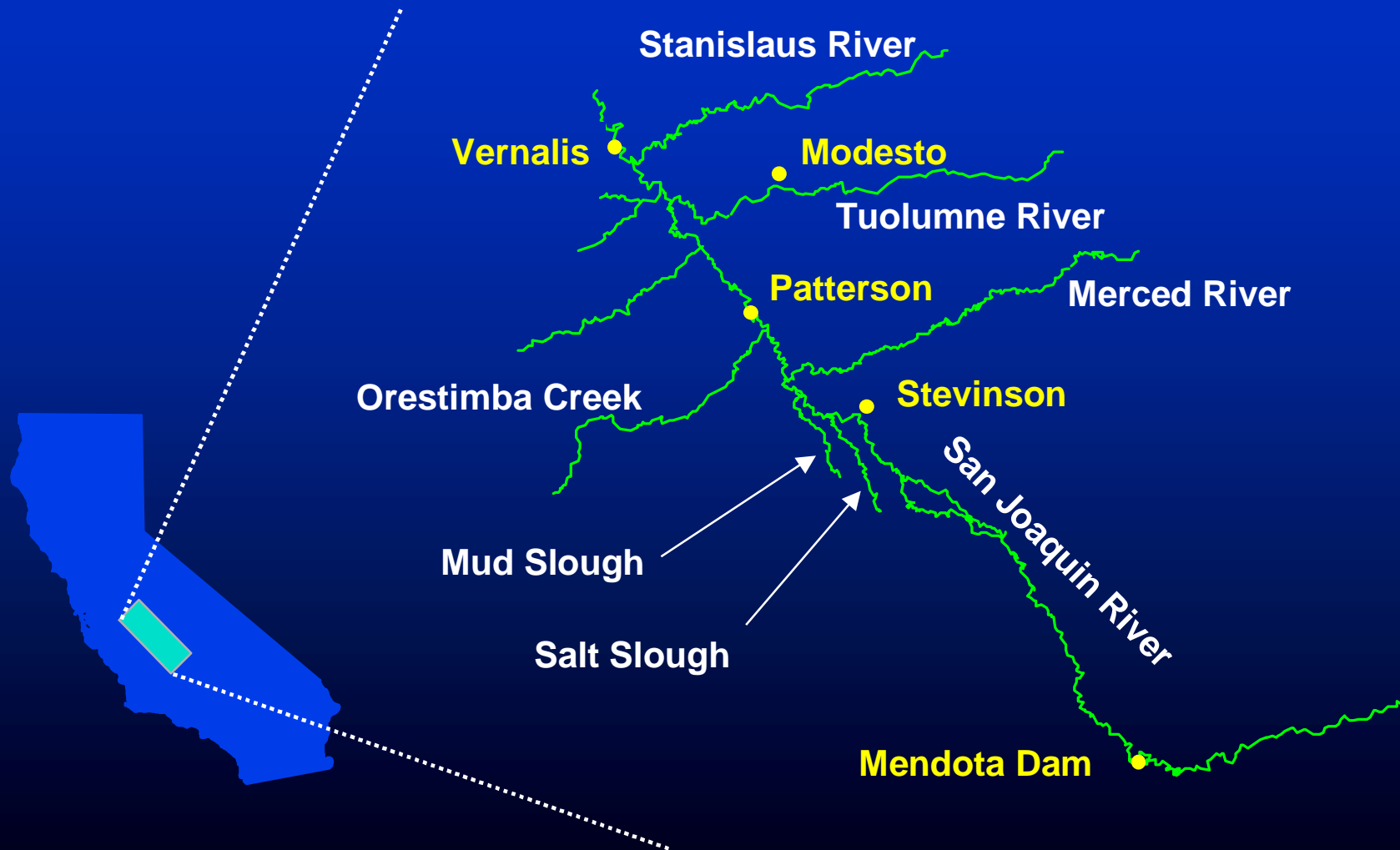
# Background

Diane Beaulaurier

# Background

- Project area
- Legal requirements, regulations and policies
- Water quality impairment and sources

# Project Area for Organophosphorus Pesticide (OP) Pesticide TMDL



Note: TMDL is for mainstem San Joaquin River only

# SJR Watershed

- 13,500 square mile drainage area
- 3 Major east-side tributaries
- 5 Minor west-side tributaries
- Extensive agricultural land use

# 303(d) Listing

- 1994 Listing under Section 303d Clean Water Act
- 130 miles from Mendota Dam to Airport Way Bridge near Vernalis
- Aquatic invertebrate toxicity
  - Aquatic invertebrates are base of food web
  - Aquatic life beneficial use not supported
- High OP concentrations year round
  - Dormant Season (December through February)
  - Irrigation Season (March through September)

# Legal Requirements

- Federal Clean Water Act requires TMDLs for impaired waters [303(d) listed]
- State Water Quality Act (Porter-Cologne) requires implementation program for TMDLs; implementation program is contained in the Basin Plan Amendment
- OP Pesticide TMDL will meet these legal obligations, and is designed to restore aquatic life beneficial use

# Policies

- Regional Board Policies
  - Controllable Factors
  - Water Quality Limited Segment
  - Antidegradation
  - Watershed
  - Application of Water Quality Objectives

# Policies

- State Board Policies
  - Implementation and Enforcement of NPS Pollution Program
  - Water Quality Control
  - Maintain High Quality of Water
  - Management Agency Agreement (MAA) with California Department of Pesticide regulation (DPR)

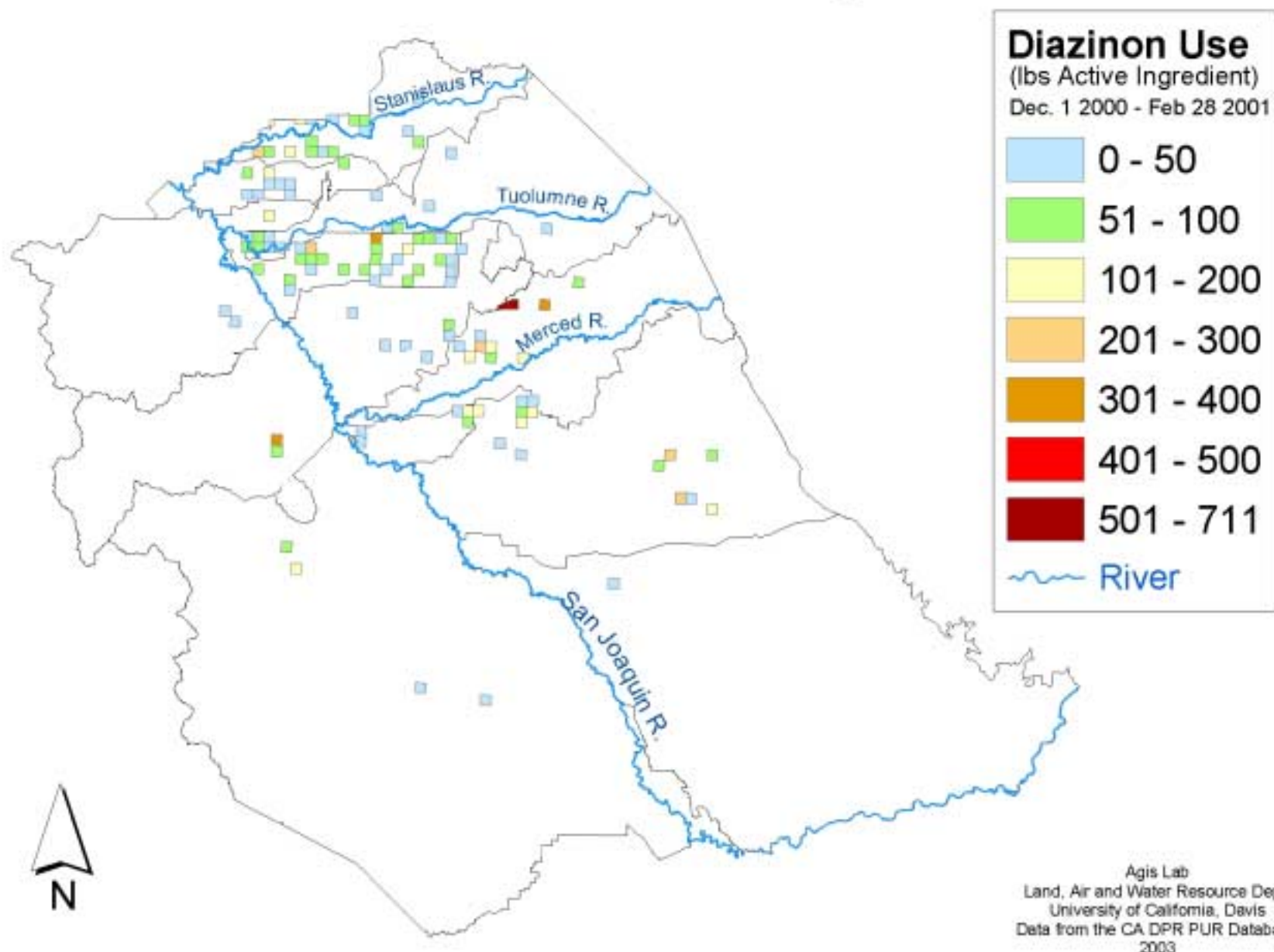
# U. S. EPA / CDPR Regulatory Actions

- U.S.EPA and DPR have primary regulatory authority of pesticides
- U.S.EPA re-registrations for all OPs
- DPR developing dormant spray regulations
- DPR label changes for diazinon in place (CA)
- DPR re-evaluation of diazinon and chlorpyrifos initiated

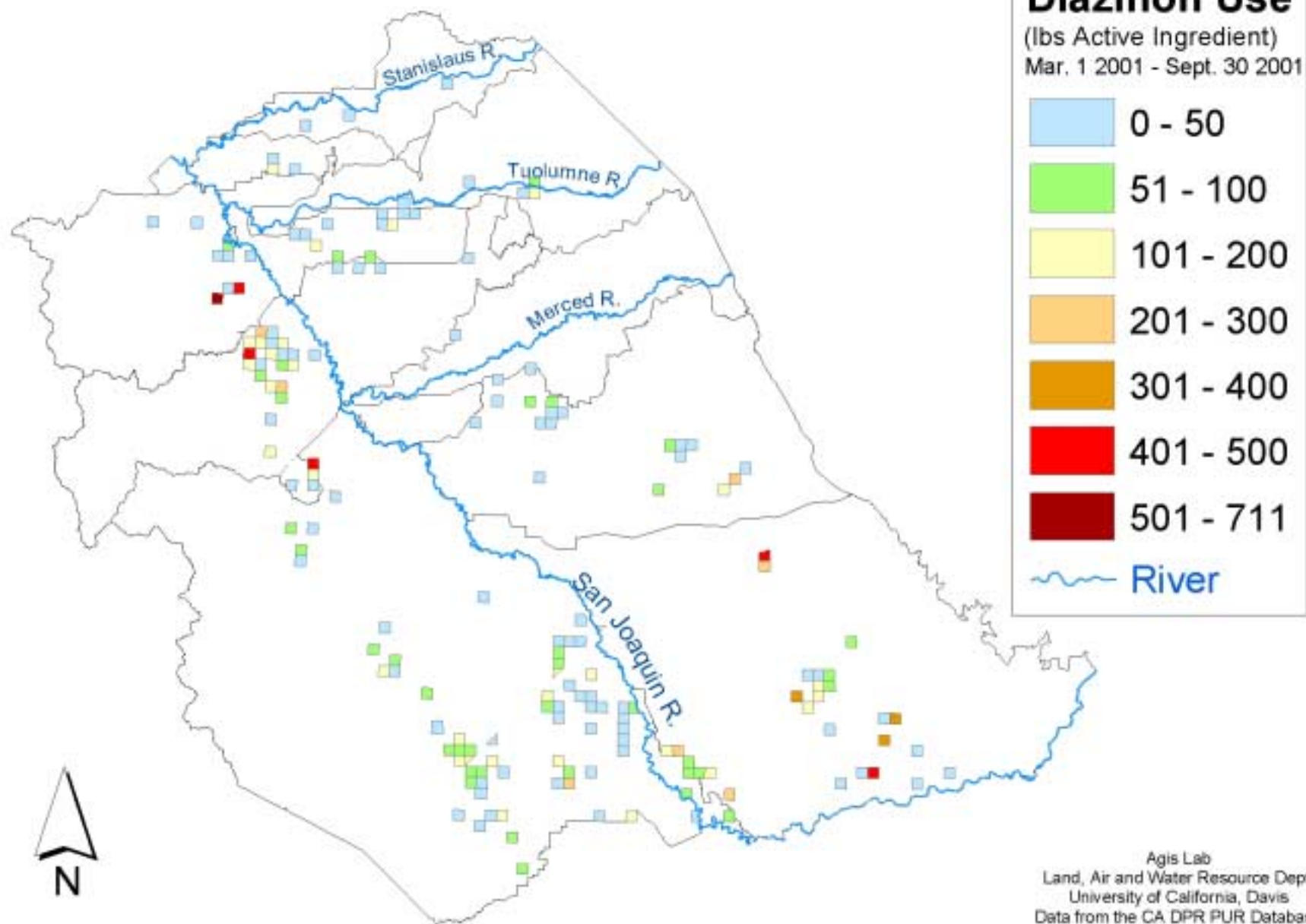
# Sources of Diazinon and Chlorpyrifos

- Stormwater runoff (dormant season)
- Irrigation runoff (irrigation season)
- Both agricultural and urban sources; agriculture is major source; use has been decreasing
- Most urban uses ended effective 12/31/2004 (USEPA re-registrations)

## Dormant Season Diazinon Use - San Joaquin Watershed 2001



# In-Season Diazinon Use - San Joaquin Watershed 2001



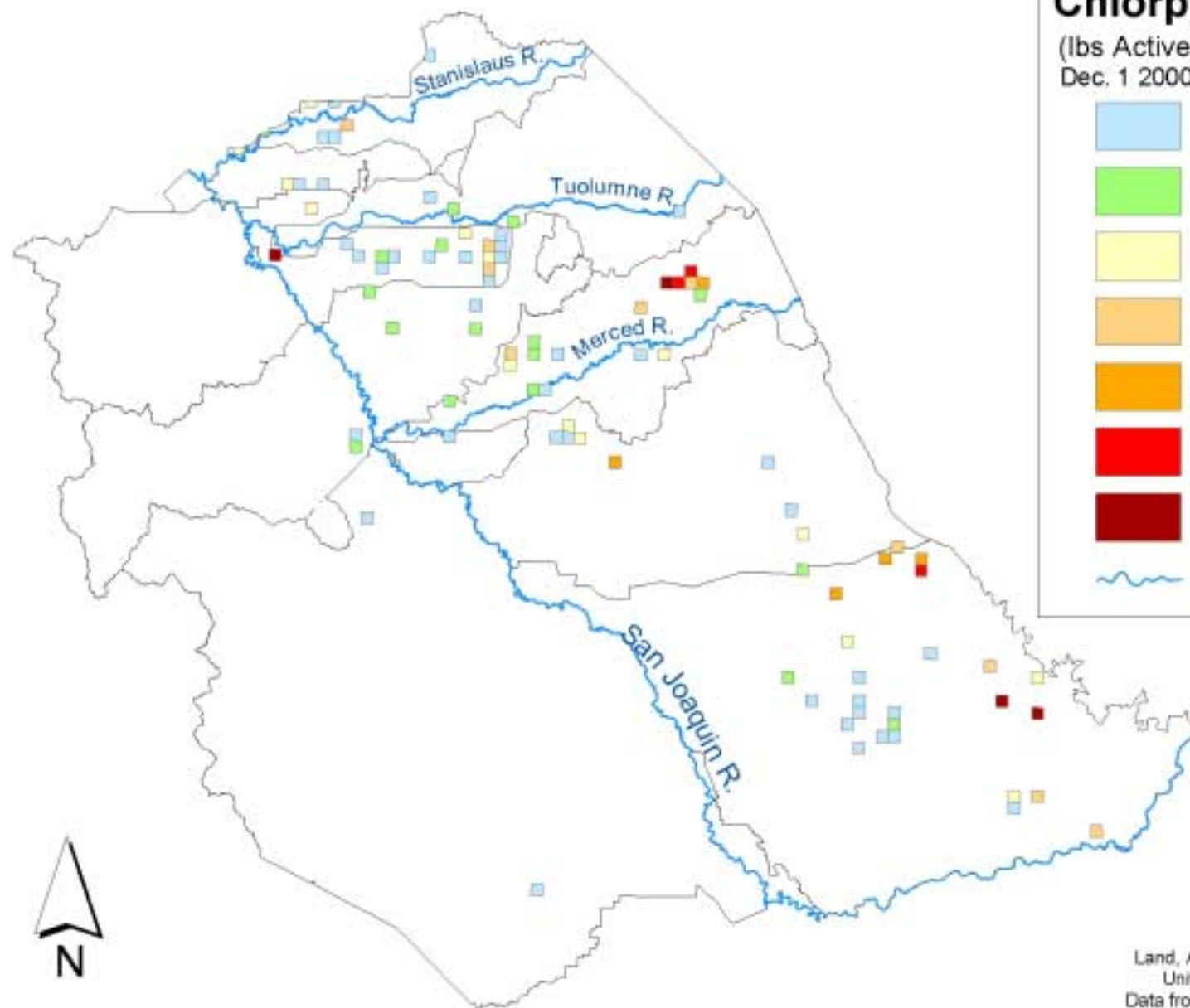
# Dormant Season Chlorpyrifos Use - San Joaquin Watershed 2001

## Chlorpyrifos Use

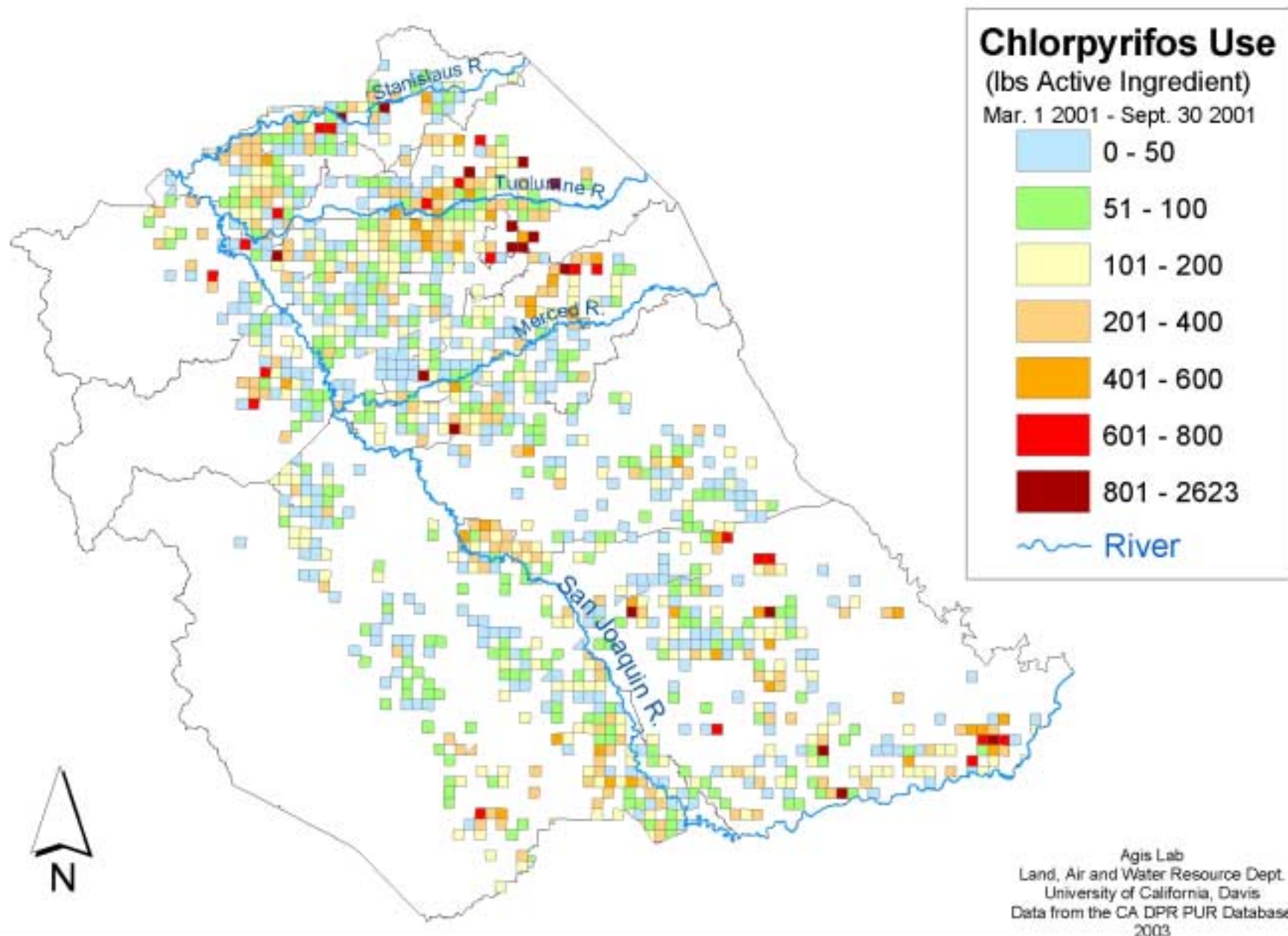
(lbs Active Ingredient)  
Dec. 1 2000 - Feb 28 2001



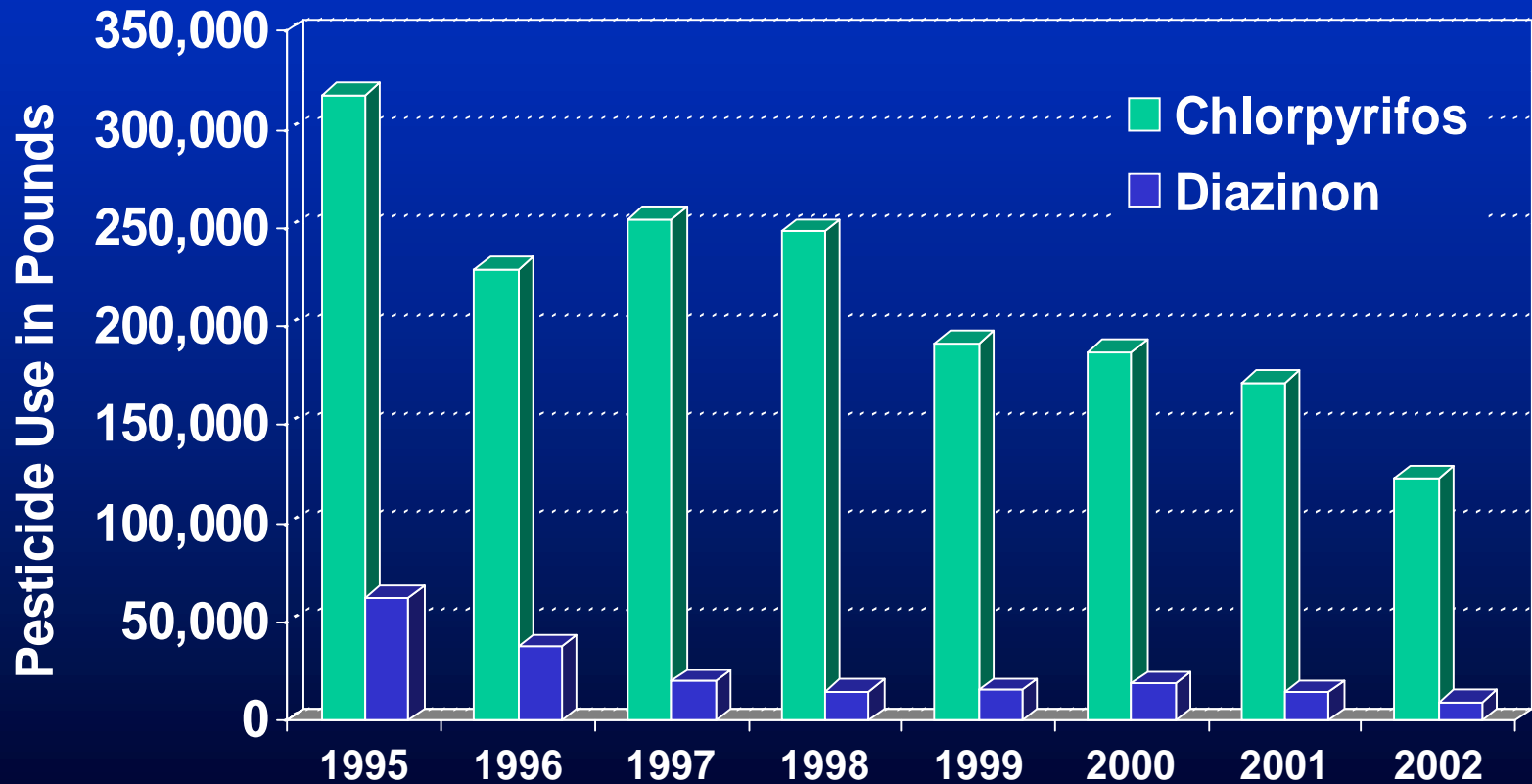
~ River



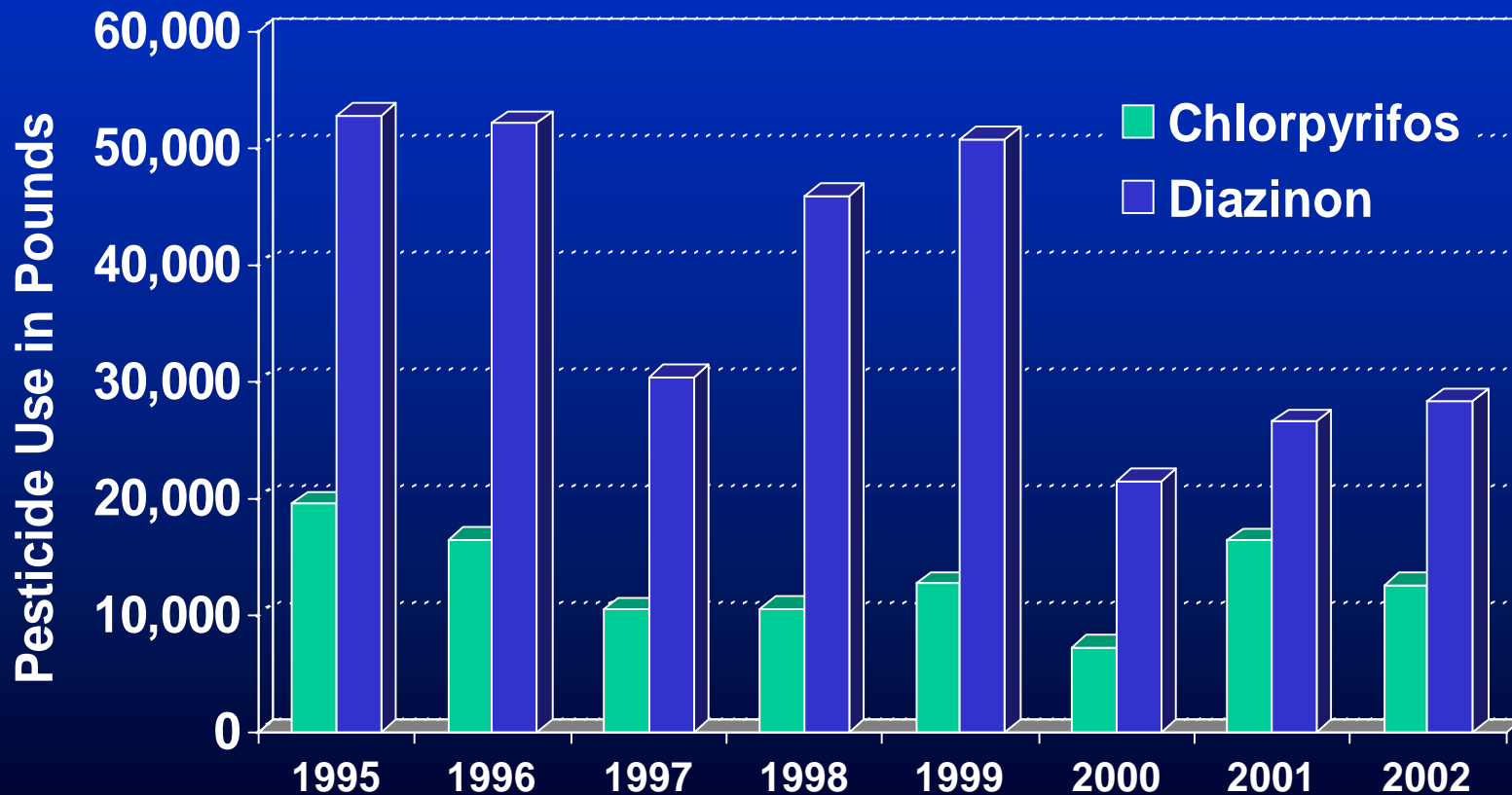
# In Season Chlorpyrifos Use - San Joaquin Watershed 2001



# Irrigation Season Use



# Dormant Season Use



# Questions?



# Basin Plan Amendment Alternatives

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# Basin Plan Amendment Elements

- Introduction
- Water Quality Standards
  - Beneficial Uses
  - Water Quality Objectives
- Program of Implementation

# Basin Plan Introduction

- Alternatives
  - No Change
  - Add descriptions of subareas, and correct inaccurate description of planning boundary between San Joaquin and Tulare Lake Basins

# Beneficial Use Alternatives

- Determine most sensitive use
- No change to Aquatic Life use
- Add new use
- Modify existing use

# Narrative Objective is “No Toxics in Toxic Amounts”

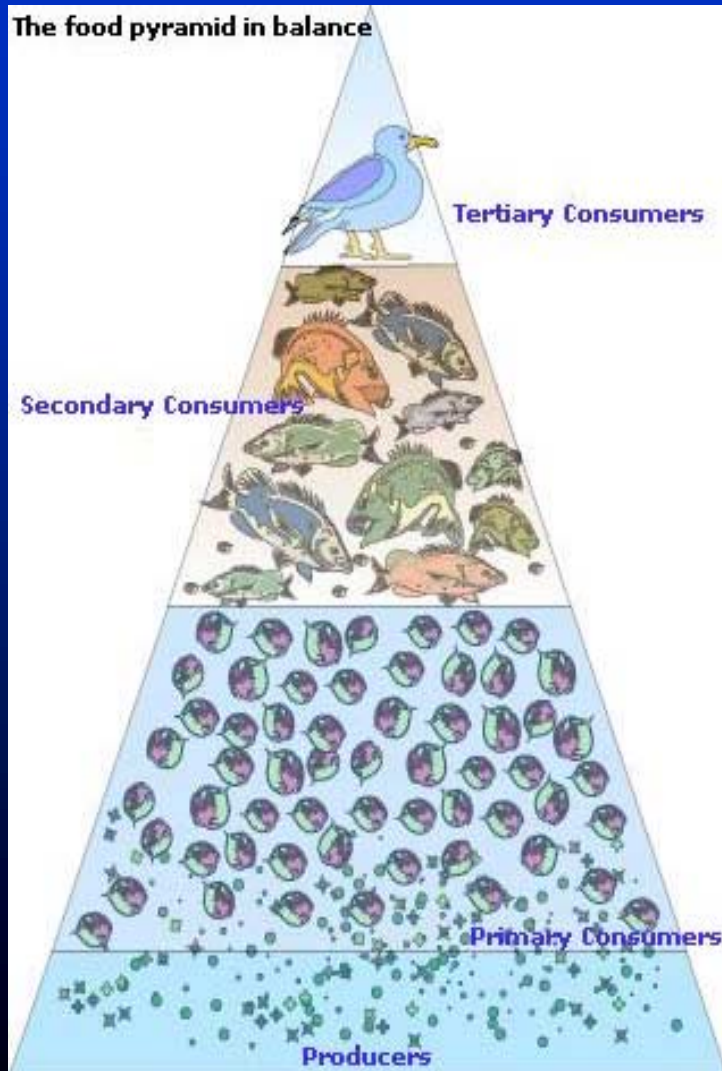
- Toxicity is typically determined using indicator species
  - Fish
  - Zooplankton
  - Phytoplankton



*Ceriodaphnia dubia*

# When Diazinon and Chlorpyrifos Enter Rivers, the Food Pyramid Can Be Disrupted

\*Drawings  
courtesy of  
UCIPM.  
www.ipm.  
ucdavis.edu



# Water Quality Objectives

- Diazinon alone
- Chlorpyrifos alone
- Additive toxicity

# Water Quality Alternatives for Diazinon

- No change to narrative objective
- No diazinon
- Propose new water quality objectives

# Alternative Water Quality Objectives for Diazinon

<b>Aquatic Life Criteria for Surface Water</b>	<b>µg/L</b>
CDFG Aquatic Life Criteria for freshwater – 4 day average concentration	0.05
CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration	0.08
Recalculated CDFG Aquatic Life Criteria for freshwater – 4 day average concentration	0.10
Recalculated CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration	0.16
EPA Draft Aquatic Life Criteria for freshwater – 4 day average concentration	0.10
EPA Draft Aquatic Life Criteria for freshwater – 1 hour maximum concentration	0.10
Australian and New Zealand trigger values (95% protection- based on NOEC)	0.010
Australian and New Zealand trigger values (99% protection – based on NOEC)	0.00003
1/10 <sup>th</sup> Species mean average value ( <i>Ceriodaphnia dubia</i> ) (Basin Plan)	0.044
<b>Human Health Criteria for Drinking Water</b>	
USEPA Suggested No Adverse Response Levels (SNARL) for non-cancer toxicity	0.600
California Department of Health Services State Action Level for Toxicity	6.000
National Academy of Sciences SNARL for non-cancer toxicity	14.000
Canadian Environmental Quality Guidelines	20.000
<b>Other</b> - No observed effect concentration on salmon anti-predator response (Scholz, 2000)	<b>0.100</b>

# Alternative Water Quality Objectives for Chlorpyrifos

- No change to narrative objective
- No chlorpyrifos
- New water quality objectives

# Alternative Water Quality Objectives for Chlorpyrifos

<b>Aquatic Life Criteria for Surface Water</b>	<b>µg/L</b>
CDFG Aquatic Life Criteria for freshwater – 4 day average concentration	0.014
CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration	0.02
EPA Draft Aquatic Life Criteria for freshwater – 4 day average concentration	0.041
EPA Draft Aquatic Life Criteria for freshwater – 1 hour maximum concentration	0.083
Canadian Environmental Quality Guidelines	0.0035
Australian and New Zealand trigger values (95% protection based on NOEC)	0.010
Australian and New Zealand trigger values (99% protection based on NOEC)	0.00004
1/10 <sup>th</sup> Species mean average value ( <i>Ceriodaphnia dubia</i> ) (Basin Plan)	0.006
<b>Human Health Criteria for Drinking Water</b>	
USEPA Suggested No Adverse Response Levels (SNARL) for non-cancer toxicity	20.000
Canadian Environmental Quality Guidelines	90.000
<b>Agriculture-Livestock</b>	
Canadian Environmental Quality Guidelines	24.000

# Water Quality Additivity Formula

- Additive Toxicity:
  - Multiple pesticides increase aquatic toxicity
  - Must meet existing additivity formula for pesticides with same toxicity mechanism (e.g. cholinesterase inhibition for OP pesticides)

# Water Quality Additivity Formula

$$\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

where

$C_D$  = diazinon concentration in the receiving water.

$C_C$  = chlorpyrifos concentration in the receiving water.

$WQO_D$  = acute or chronic diazinon water quality objective or criterion.

$WQO_C$  = acute or chronic chlorpyrifos water quality objective or criterion.

# Questions?



# Program of Implementation

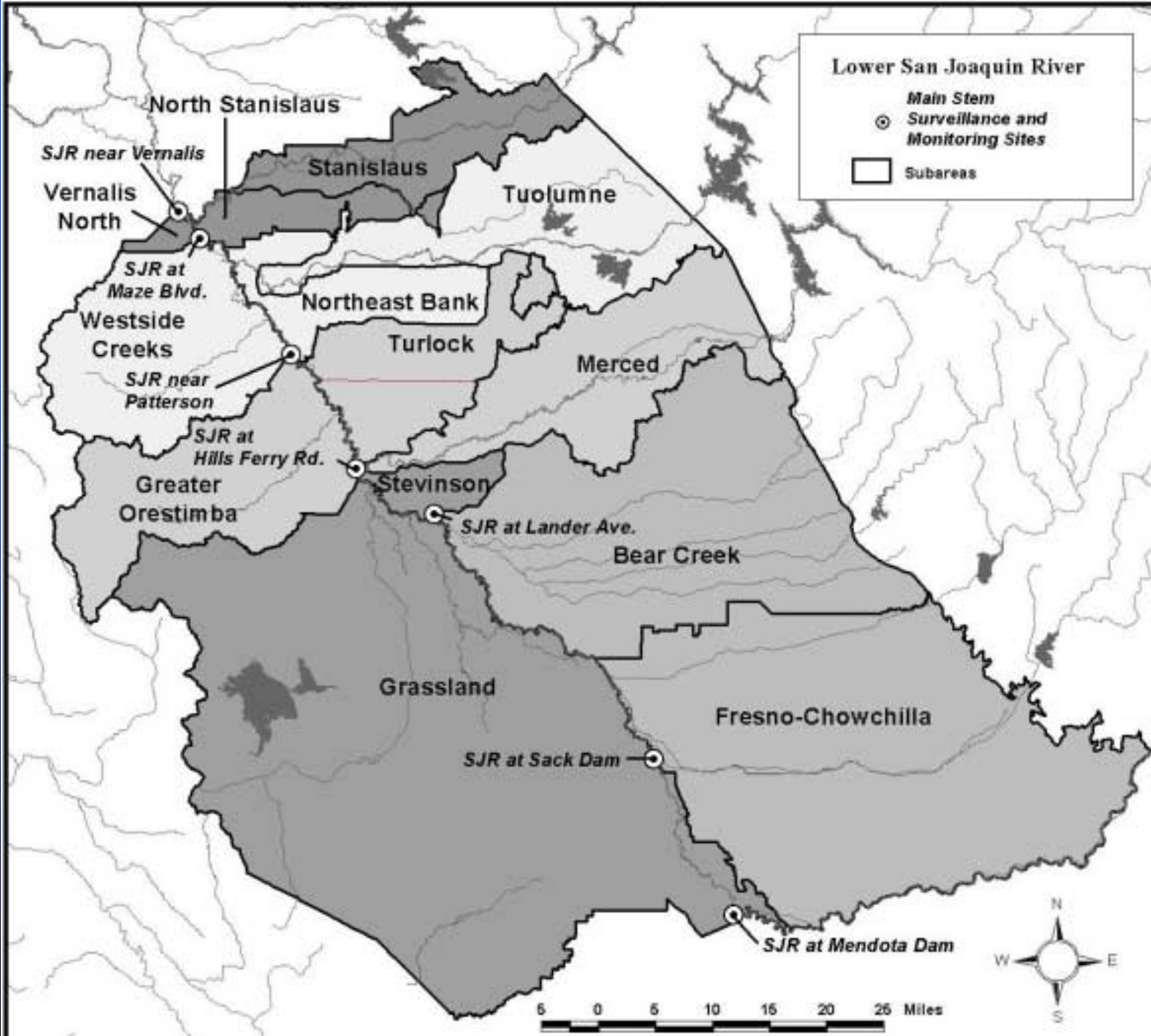
Joe Karkoski

# Program of Implementation

- Load Limits and Control Actions
  - Load Allocations
  - Implementation Alternatives

# Load Limits and Allocations

- Allocation of Loading Capacity
  - Load Allocations to non-point sources
  - Waste Load Allocations to point sources



# Available Practices and Technology

- Reduce loads from sources
- Pest management practices
- Pesticide application practices
- Water management practices

# Implementation Alternatives

- Conditional Prohibition of Discharge
- Waste Discharge Requirements (WDRs)
- Conditional Waiver of WDRs

# Scoping Questions?

- Project area?
- Water Quality Standards?
  - Beneficial use
  - Water Quality Objectives
- Implementation?

# BREAK



# Where are we now?

- Upcoming peer review of Draft Report
- Draft Recommendations for peer review
  - Water Quality Standards
  - Program of Implementation
- Public comments upon release of Draft Report after peer review

# Proposed Recommendations (Peer Review Draft Staff Report)

# Introduction Recommendation

- Add descriptions of subareas, and correct inaccurate description of planning boundary between San Joaquin and Tulare Lake Basins

# Proposed Recommendations Water Quality Standards

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# Beneficial Use Recommendation

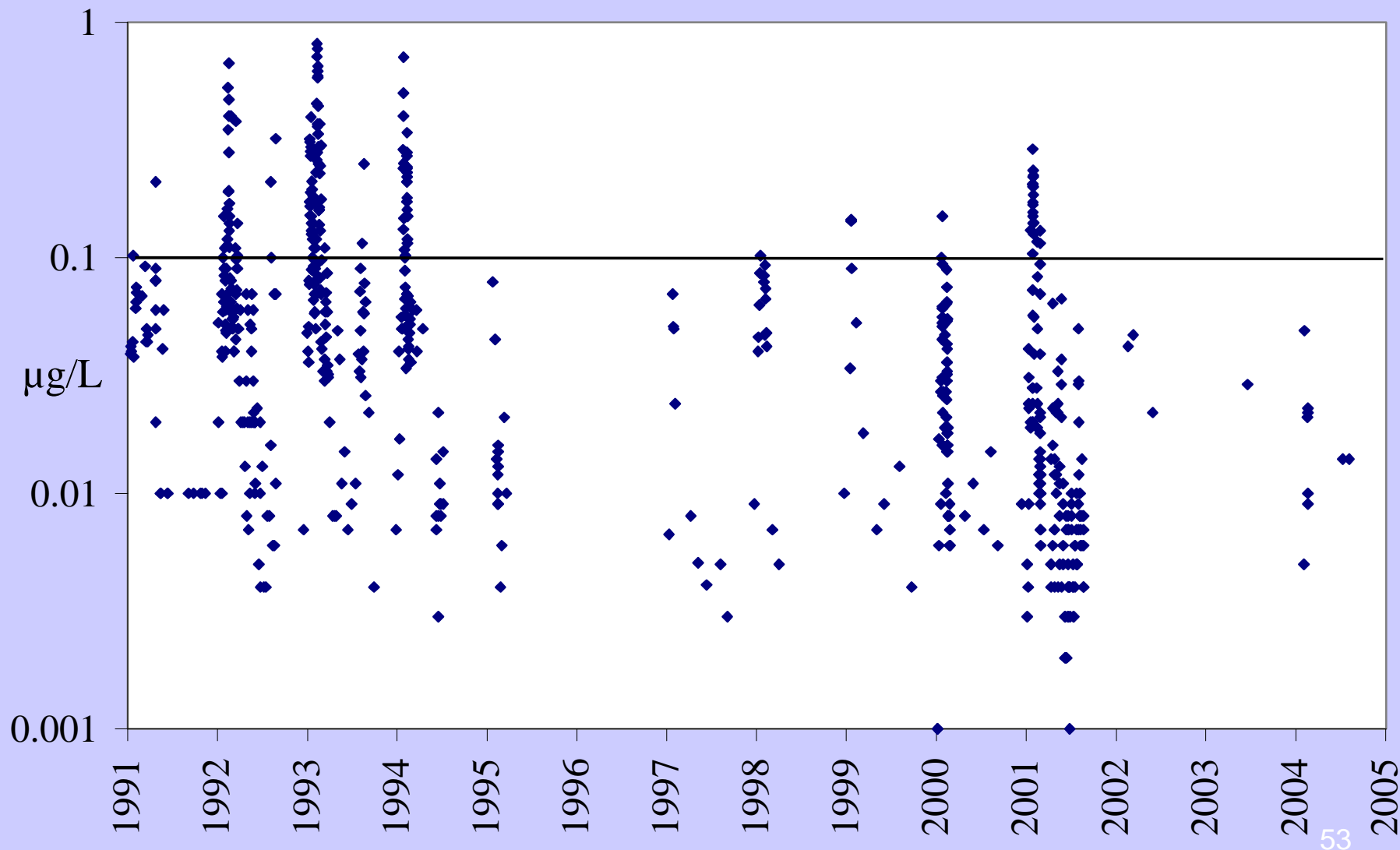
- Recommendation – No Change
- Aquatic Life use is most sensitive to OP pesticides



# Recommended Water Quality Objectives for Diazinon

- No new water quality objective at this time
- Propose new water quality targets (TMDL only)
  - For diazinon alone:  
Acute = 0.100 µg/L (Scholz 2000)
  - For diazinon in combination with chlorpyrifos:  
Acute = 0.16 µg/L; Chronic = 0.10 µg /L  
(recalculated CDFG criteria)
- Future development of WQOs

# San Joaquin River Mainstem Diazinon Concentrations

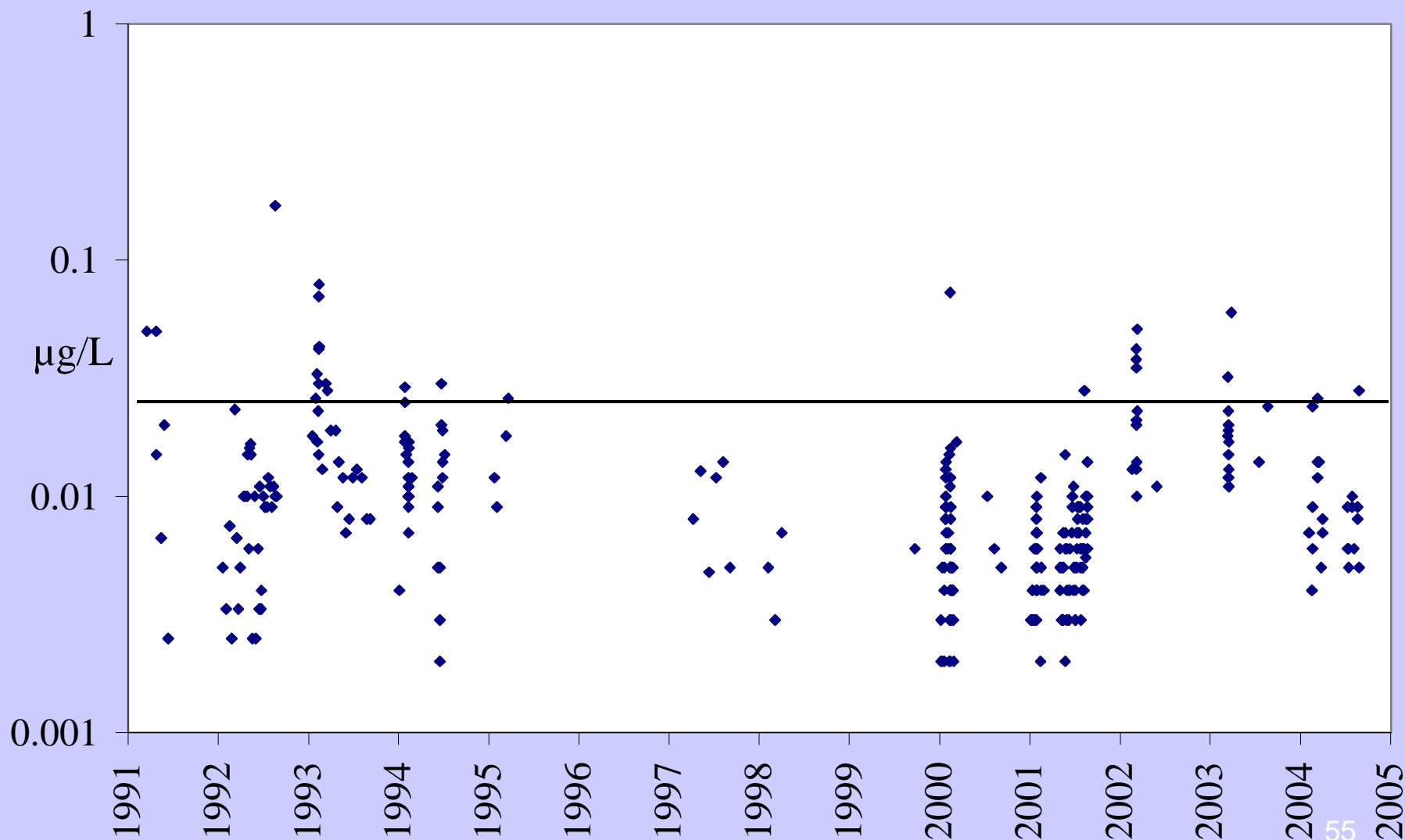


# Recommended Water Quality Objectives for Chlorpyrifos

- New Water Quality Objectives (CDFG criteria):
  - Acute = 0.025 ug/L
  - Chronic = 0.014 µg/L

Note: Acute criterion recalculated to two significant figures per US EPA methodology (1985)

# San Joaquin River Mainstem Chlorpyrifos Concentrations



# Water Quality Additivity Formula

$$\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

where

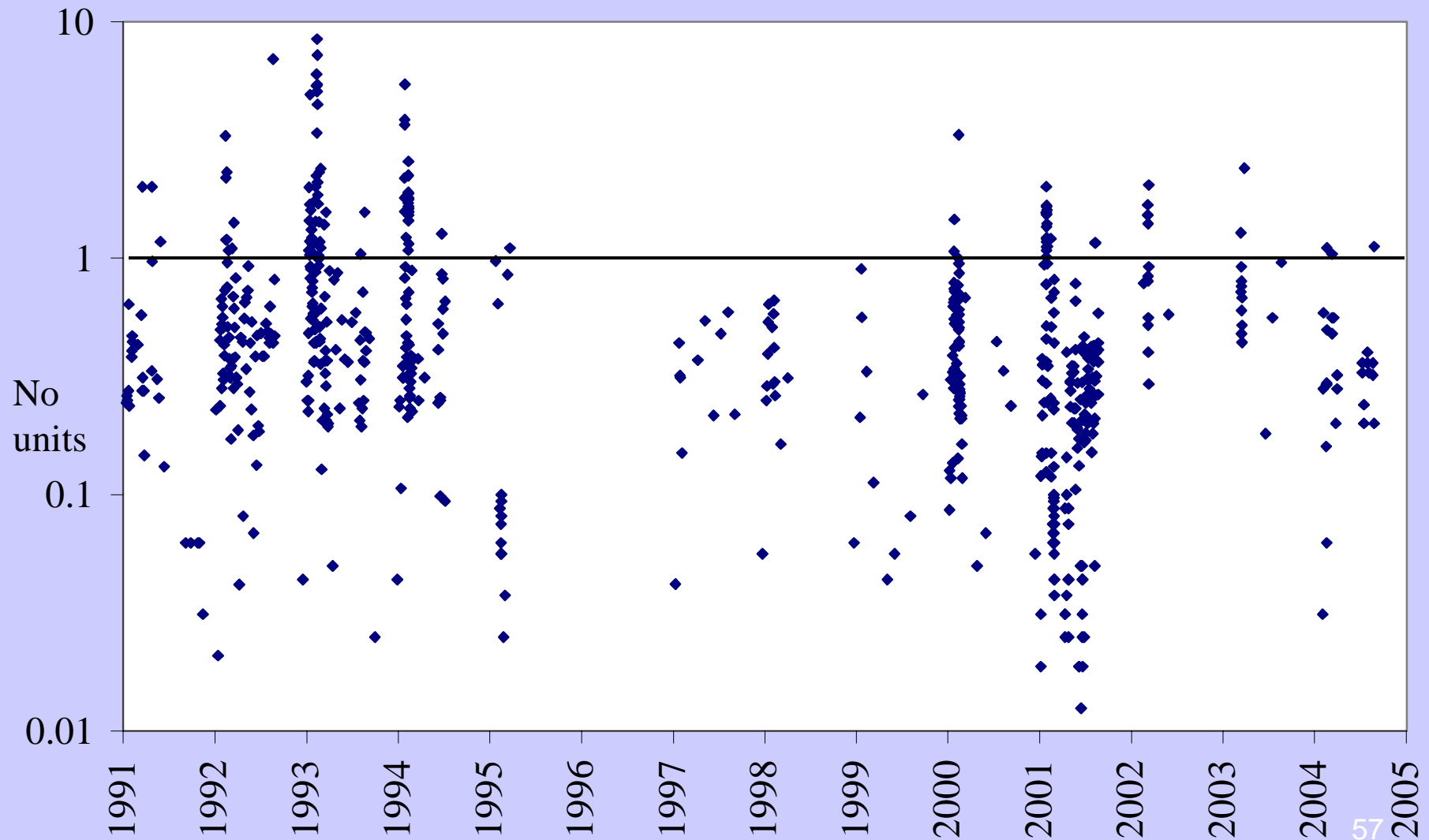
$C_D$  = diazinon concentration in the receiving water.

$C_C$  = chlorpyrifos concentration in the receiving water.

$WQO_D$  = acute or chronic diazinon water quality objective or criterion.

$WQO_C$  = acute or chronic chlorpyrifos water quality objective or criterion.

# San Joaquin River Mainstem Additive Toxicity (Diazinon + Chlorpyrifos)



# Review Water Quality Standards Recommendations

- Aquatic life beneficial use is most sensitive for OP pesticides
- Establish water quality targets for diazinon
- Establish water quality objectives for chlorpyrifos
- Meet existing additive toxicity formula

# Proposed Recommendations Implementation

Joe Karkoski

# Recommended Implementation Alternative

- Two Conditional Prohibitions of Discharge
  - Dormant season (Dec - Feb)  
If objectives or loads exceeded in previous year
  - Irrigation season (March – Sept)  
If objectives or loads exceeded in previous year

Backstop for waiver or WDRs

# How would TMDL interface with Ag Waiver?

- Ag waiver expires December 2005
- Ag Waiver could be renewed or new waiver could be developed.
- TMDL will assure that either
  1. any applicable waiver or WDR will implement WQOs and load allocations, or
  2. conditional prohibition of discharge will take effect

# Other Proposed Basin Plan Amendment Elements

Joe Karkoski

# Other Basin Plan Amendment Elements

- Management Plans
- Surveillance and Monitoring
- Time Schedule
- Economic Analysis

# Management Plans

- Dischargers to submit management plans
- Plan will describe actions taken to reduce OP runoff and meet allocations
- Plan may include actions required by state and federal pesticide regulations
- Document link between actions and expected reductions

# Management Plans

- Individual dischargers, discharger groups or coalitions could submit plans
- Plan must comply with any applicable WDRs or Waiver
- Regional Board will review and may require revisions

# Surveillance and Monitoring

- Determine Success of Amendment
- Discharger Ultimately Responsible

# Surveillance and Monitoring

- Program Goals
  - Compliance with Objectives
  - Compliance with Load Allocations
  - Effectiveness of Management Practices
  - Avoid toxicity from alternative pesticides

# Time Schedule for Compliance

- Time schedules will be needed for:
  - Compliance with objectives and allocations
  - Dormant season prohibition
  - Irrigation season prohibition
  - Submission of Management Plans
  - Monitoring

# Economic Analysis

- NPS Discharger Costs
  - Dormant season practices
  - Irrigation season practices
  - Monitoring, planning, evaluation
- NPDES Permittee Costs
  - Not anticipated due to elimination of urban uses
  - Costs if alternatives cause toxicity

# Economic Analysis

- Potential sources of financing
  - Government grants, loans or appropriations
  - Surcharge on water
  - Ad Valorem tax
  - Fees by drainage management district
  - Private financing

# Review Program of Implementation Recommendations

- Load limits and control actions
- Allocation of loads for point and nonpoint sources
- Two Conditional Prohibitions of Discharge
  - Dormant season (December – February)
  - Irrigation season (March – September)
- Backstop for waiver or WDRs

# Questions?



# Summary

Les Grober

# The Big Ideas:



- Diazinon and chlorpyrifos impair 130 miles of SJR
- Sources are primarily agricultural
- Need to avoid causing new impairments
- Solutions are available (e.g., Integrated Pest Management (IPM), management practices, grant funds)

# The Big Ideas:



- No change to WQOs for diazinon at this time; use best available information to interpret narrative objective
- Propose CDFG chlorpyrifos criteria as WQOs
- Existing formula for additive toxicity
- Conditional prohibitions if objectives or loads not met, and if not already regulated by waiver or WDRs

# Questions?



# Next Steps

- Draft staff report to be released March/April
- Board Workshop in April or June
- Submit comments regarding scope

# Next Steps

Submit comments to:

Diane Beaulaurier

CVRWQCB

11020 Sun Center Drive, #200

Rancho Cordova, CA 95670-6114

[dbeaulaurier@waterboards.ca.gov](mailto:dbeaulaurier@waterboards.ca.gov)

Program info:

<http://www.waterboards.ca.gov/centralvalley/programs/tmdl/sjrop/>

Listserve:

[http://www.waterboards.ca.gov/lyrisforms/reg5\\_subscribe.html](http://www.waterboards.ca.gov/lyrisforms/reg5_subscribe.html)

# THANK YOU!

